# FIRE PROTECTION ENGINEERING (FPE)

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## FPE Courses

**FPE 5500 Individual Study (1-4 units)**
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Advanced study planned and completed under the direction of a member of the program faculty. Open only to graduate students in the FPE program who have demonstrated ability to do independent work. Repeatable up to 8 units. Formerly FPE 500.

**FPE 5501 Fundamental Thermal Sciences (3 units)**
Term Typically Offered: F
Prerequisite: Graduate standing.

Introduction to the thermal sciences, including thermodynamics, fluid dynamics and heat transfer, as related to fire protection engineering. Includes 1st and 2nd laws of thermodynamics, conservation relations, hydrostatics, internal and external flows, and heat transfer by conduction, convection and radiation. Course may be offered in classroom-based or online format. 3 lectures. Formerly FPE 501.

**FPE 5502 Fire Dynamics and Flammability (4 units)**
Term Typically Offered: TBD
Prerequisite: FPE 501 or FPE 5501.

Fundamentals of combustion and fire dynamics. Material and product flammability regulation. Building analysis and assessment of fire hazards based on explicit fire protection engineering goals and objectives. Formulation and technical justification of design fires and analysis of fire protection systems. Course may be offered in classroom-based or online format. 4 lectures. Formerly FPE 502.

**FPE 5504 Fire Modeling and Applications (4 units)**
Term Typically Offered: SU
Prerequisite: FPE 502 or FPE 5502.

Fire modeling techniques for fire safety assessment. Application of engineering correlations and computer-based fire models, including zone models and computational fluid dynamics models, to representative fire problems. Smoke management principles and systems detailed and analyzed. Course may be offered in classroom-based or online format. 4 lectures. Formerly FPE 504.

**FPE 5521 Fire Detection, Alarm and Egress Systems (4 units)**
Term Typically Offered: F
Prerequisite: Graduate standing.

Regulatory and performance-based analysis for fire alarm systems and egress systems in buildings. Analysis of performance characteristics of fire detectors. Introduction to methods for calculating people movement and evacuation times, including computer-based evacuation simulation models. Course may be offered in classroom-based or online format. 4 lectures. Formerly FPE 521.

**FPE 5523 Fire Suppression Systems (4 units)**
Term Typically Offered: TBD
Prerequisite: Graduate standing.

Fire suppression agents, systems and applications. Analysis of automatic sprinkler systems, including water supply analysis and hydraulic calculations. Analysis of special hazard systems, including water spray, water mist, foam, clean agent, carbon dioxide, inert gas, and dry and wet chemical systems. Course may be offered in classroom-based or online format. 4 lectures. Formerly FPE 523.

**FPE 5524 Structural Fire Protection (3 units)**
Term Typically Offered: SU
Prerequisite: Graduate standing.

Performance analysis procedures and residual capacity calculation methods of structural components under fire-induced thermal exposures. Materials detailed include wood, steel, concrete, and composites. Regulatory and fire resistance requirements and traditional and innovative protection schemes of various building conditions types. Course may be offered in classroom-based or online format. 3 lectures. Formerly FPE 524.

**FPE 5551 Fire Risk Analysis (2 units)**
Term Typically Offered: F
Prerequisite: Graduate standing.

Fire safety design methodologies including prescriptive and performance-based design with specifics focused on risk-based analysis and connections between design methods. Identification and application of different fire risk management tools and techniques. Course may be offered in classroom-based or online format. 2 lectures. Formerly FPE 551.

**FPE 5552 Advanced Modeling in Fire Protection Engineering (2 units)**
Term Typically Offered: F
Prerequisite: FPE 504 or FPE 5504.

Advanced concepts encompassing aspects of fire protection engineering including evacuation modeling, fire modeling, and structural fire modeling. Limitations, complexity, and diminishing returns of modeling. Factor of safety selection for Required Safe Egress Time (RSET), Available Safe Egress Time (ASET), and structural integrity time (SIT) based on uncertainty analysis. Course may be offered in classroom-based or online format. 2 lectures.

**FPE 5554 Forensic Fire Analysis (2 units)**
Term Typically Offered: SP
Prerequisite: Graduate standing. Recommended: FPE 504 or FPE 5504.

Introduction to fire investigation and reconstruction. Engineering analysis of structural and wildland fires. Identification of failure mechanisms in fire safety systems. Case studies of actual fire incidents to address and reinforce concepts related to different types of performance failures. Course may be offered in classroom-based or online format. 2 lectures. Formerly FPE 554.

**FPE 5555 Fire Protection Management in the Wildland-Urban Interface (WUI) (2 units)**
Term Typically Offered: SP
Prerequisite: Graduate standing.

Technological and social issues affecting fire management in wildland-urban interface landscapes. Factors including the wildland fire environment, suppression, construction, access, prevention and evacuation. Fire risk analysis; needs assessment, legislative codes, standards and policies; incident response planning. Course may be offered in classroom-based or online format. 2 lectures. Formerly FPE 555.

**FPE 5570 Special Advanced Topics (2 units)**
Term Typically Offered: SP
Prerequisite: Graduate standing and consent of instructor.

Directed group study of special topics for advanced students. The Class Schedule will list topic selected. Repeatable up to 4 units. Course may be offered in classroom-based or online format. 2 lectures. Formerly FPE 570.

**FPE 5595 Cooperative Education Experience (1-4 units)**
Term Typically Offered: SU
Prerequisite: Consent of instructor.

Curricular Practical Training (CPT) to gain work experience directly related to fire protection engineering. Intended for international students. CPT work authorization is required for all paid or non-paid, part- or full-time employment and internships. Repeatable up to 4 units. Formerly FPE 593.

**FPE 5598 Project (1-4 units)**
Term Typically Offered: SP
Prerequisite: FPE 504 or FPE 5504 and consent of instructor.

Performance of comprehensive fire and life safety evaluations of buildings and other structures. Communication of the results and findings of such evaluations in written report and by oral presentation to satisfy the culminating experience for a master's degree. Conducted under supervision of faculty. Repeatable up to 4 units. Formerly FPE 596.

**FPE 5599 Thesis (1-6 units)**
Term Typically Offered: TBD
Prerequisite: Consent of instructor.

Each individual will be assigned a thesis project for solution under faculty supervision as a requirement for the master's degree, culminating in a written thesis. Repeatable up to 6 units. Formerly FPE 599.